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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,093	03/02/2004	Robert Scott Winsor	0918.0269C	1178

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EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 03/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/790,093	WINSOR, ROBERT SCOTT	
	Examiner	Art Unit	
	Quan-Zhen Wang	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 January 2006 and 19 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-40 and 44-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-40 and 44-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 19, 2005 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-10, 12-17, 19-31, 33-38, 40, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al. (U.S. Patent US 5,786,923) in view of Liou (U.S. Patent US 5,623.363) and further in view of Buser et al. (U.S. Patent US 4,361,911).

Regarding claims 1, 24, and 47 Doucet teaches a method for light transmit across a free space (fig. 1, 100), the method comprising: generate a substantially phase incoherent beam of light (column 4, lines 52-56); collimating the phase incoherent beam

of light (fig. 8, optical antenna 710); and propagating the phase incoherent collimated beam of light across the free space (fig. 8, to/from optical router unit). The system of Doucet differs from the claimed invention in that Doucet does not specifically teach that the light source for the incoherent light beam is a LED coupled to a single mode fiber. However, it is well known in the art to generate incoherent light beam using a LED coupled to a single mode fiber. For example, Liou discloses a light source comprising a LED coupled to a single mode fiber (fig. 1; column 2, lines 66-67 and column 3, line 1). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a LED coupled to a single mode fiber, as it is taught by Liou, into the system of Doucet as the light source in order to provide phase incoherent light beam. Doucet and Liou further differs from the claimed invention in that Doucet and Liou do not specifically discloses that the system reduces atmospheric scintillation when transmitted across the free space and optimizes energy efficiency of the light transmission explicitly. However, it has been well known in the art that atmospheric scintillation can be reduced by using incoherent source. For example, Buser discloses that the effect of atmospheric scintillation can be reduced by using incoherent source (multiple wavelength source) (column 6, lines 36-47). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use the concept of atmospheric scintillation reduction, as it is taught by Buser, in the system of Doucet and Liou in order to reduce the atmospheric scintillation. As a matter of fact, the modified system of Doucet and Liou inherently reduces atmospheric scintillation when transmitted across the free space and optimizes

energy efficiency of the light transmission because the light source is incoherent. As to claim 47, Doucet further teaches modulating (fig. 8, beam modulator 752) the beam of light (fig. 8, light source 754) with data to be transmitted from source to a destination across the free space, and the distance can obviously be of at least one kilometer.

Regarding claims 3-5 and 25-27, the system of Doucet differs from the claimed invention in that Doucet does not specifically teach that the system includes various claimed methods of generating incoherent beams of lights. However, the examiner takes Official Notice that the methods of generating incoherent beams of lights in claims 3-5 and 25-27 are well known light generating methods in the art. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate any of the methods in claims 3-5 and 25-27 into the system of the Doucet as the light source of the system, wherein the claimed differences involved to the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. *In re Ruff, 118, USPQ, 343 (CCPA 1958).*

Regarding claims 6-7 and 28-29, the system of Doucet differs from the claimed invention in that Doucet does not specifically teach that the system includes a light amplifier for amplifying the incoherent beam. However, the examiner takes Official Notice that amplifying incoherent light using a light amplifier, such as an Erbium doped fiber amplifier, is well known in the art. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a light

amplifier, such as an Erbium doped fiber amplifier, in the system of the Doucet in order to amplify the incoherent beam.

Regarding claims 9-10 and 30-31, the system of Doucet differs from the claimed invention in that Doucet does not specifically teach that the system includes filtering the incoherent beam to reduce the bandwidth of wavelength spectrum, or bandwidth limiting the incoherent beam into a plurality of bandwidth channels. However, the examiner takes Official Notice that is well known in the art to filter an incoherent beam to reduce the bandwidth of wavelength spectrum, or to limit bandwidth of an incoherent beam to form a plurality of bandwidth channels. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate filters in the system of the Doucet in order to filter the incoherent beam to reduce the bandwidth of wavelength spectrum, or to limit bandwidth of the incoherent beam to form a plurality of bandwidth channels.

Regarding claims 12 and 33, Doucet further teaches that the system includes collimating the beam of light with one of a conventional optical mirror (fig. 8, optical antenna 710).

Regarding claim 13, Doucet further teaches focusing the beam of light onto a primary focal plane of a telescope (fig. 8, lens 780).

Regarding claim 14, Doucet further teaches directing the optical beam towards an optical receiver using active pointing techniques (fig. 8, active optical control system 760).

Regarding claims 15 and 36, Doucet further teaches directing the optical beam towards an optical receiver using static pointing techniques (column 17, lines 39-48).

Regarding claims 16-17, and 37-38, Doucet further teaches to modulate the phase incoherent beam of light to encode data upon the beam of light (fig. 8, beam modulator 752).

Regarding claims 19, and 40, Doucet further teaches to modulate WDM channels within the beam of light (column 8, lines 13-20).

Regarding claim 20, Doucet further teaches to receive the incoherent beam from free space (fig. 8, signals to/from optical router).

Regarding claim 21, Doucet further teaches tracking the receiving beam of light using active pointing and tracking techniques (column 17, lines 49-54).

Regarding claims 22-23, Doucet further teaches to detect one of light and darkness within the received beam of light (inherent), thereby to produce a received data stream and demodulate the received data stream (fig. 8, Beam demodulator 772 and receiver 770).

Regarding claim 34, Doucet further teaches that the propagating optics is a telescope (fig. 8, optical antenna 710).

Regarding claim 35, Doucet further teaches that the propagating optics further includes an active pointing and tracking module to control the direction in which the incoherent beam is propagated (fig. 8, beam alignment detector 762 and active optics control system 760).

3. Claims 11 and 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al. (U.S. Patent US 5,786,923) in view of Liou (U.S. Patent US 5,623.363) and Buser et al. (U.S. Patent US 4,361,911) and further in view of Meadows (U.S. Patent US 5,381,250).

Regarding claims 11 and 32, the system of Doucet, Liou, and Buser differs from the claimed invention in that Doucet, Liou, and Buser do not specifically teach that the system includes collimating the beam of light with a gradient index lens. However, a gradient index lens is well known in the art, and using a gradient index lens to collimate a beam of light is also well known in the art. For example, Meadows discloses to collimate a light beam using a gradient index lens (column 3, lines 47-55). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use a gradient index lens to collimate the beam of light, as it is taught by Meadows, in the modified system of Doucet, Liou, and Buser in order to direct the beam of light to a receiver with sufficient light intensity.

4. Claims 18 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al. (U.S. Patent US 5,786,923) in view of Liou (U.S. Patent US 5,623.363) and Buser et al. (U.S. Patent US 4,361,911) and further in view of Yonenaga et al. (U.S. Patent US 5,543,952).

Regarding claims 18 and 39, the system of Doucet, Liou, and Buser differs from the claimed invention in that Doucet, Liou, and Buser do not specifically teach to use an interferometer to toggle the light beam to at least one of on and off. However, it is well

known in the art to toggle (modulate) the light beam using an interferometer. For example, Yonenaga discloses to modulate the intensity of the light beam to one of on and off using an interferometer (column 3, lines 52-67 and column 4, lines 1-2). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use an interferometer to toggle (modulate) the intensity of the light beam to at least one of on and off, as it is taught by Yonenaga, in the modified system of Doucet, Liou, and Buser in order to encode the light beam.

5. Claims 44- 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al. (U.S. Patent US 5,786,923) in view of Liou (U.S. Patent US 5,623.363) and Buser et al. (U.S. Patent US 4,361,911) and further in view of Huggins (U.S. Patent US 4,799,797).

Regarding claim 44, Doucet teaches a transmitter for use in an optical light beam data link capable of transmitting a beam of light across a free space, comprising: a light source to generate a substantially phase incoherent beam of light (column 4, lines 52-56); a modulator to encode data upon the phase incoherent beam of light (fig. 8, beam modulator 752); a collimator (fig. 8, optical antenna 710) to collimate the incoherent beam of light. The system of Doucet differs from the claimed invention in that Doucet does not specifically teach that the light source for the incoherent light beam is a LED coupled to a single mode fiber. However, it is well known in the art to generate incoherent light beam using a LED coupled to a single mode fiber. For example, Liou discloses a light source comprising a LED coupled to a single mode fiber (fig. 1; column

2, lines 66-67 and column 3, line 1). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a LED coupled to a single mode fiber, as it is taught by Liou, into the system of Doucet as the light source in order to provide phase incoherent light beam. Doucet and Liou further differs from the claimed invention in that Doucet and Liou do not specifically discloses that the system reduces atmospheric scintillation when transmitted across the free space and optimizes energy efficiency of the light transmission explicitly. However, it has been well known in the art that atmospheric scintillation can be reduced by using incoherent source. For example, Buser discloses that the effect of atmospheric scintillation can be reduced by using incoherent source (multiple wavelength source) (column 6, lines 36-47). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use the concept of atmospheric scintillation reduction, as it is taught by Buser, in the system of Doucet and Liou in order to reduce the atmospheric scintillation. As a matter of fact, the modified system of Doucet and Liou inherently reduces atmospheric scintillation when transmitted across the free space and optimizes energy efficiency of the light transmission because the light source is incoherent. The system of Doucet, Liou, and Buser further differs from the claimed invention in that Doucet, Liou, and Buser do not specifically teach that the light source is a fiber-optic coupled superluminescent light emitting diode. However, a fiber-optic coupled superluminescent light emitting diode is a well-known optical source in the art. For example, Huggins used a fiber-optic coupled superluminescent light emitting diode (fig. 7, SLD 170) as the light source for the multiplexed optical sensor

system. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use a fiber-optic coupled superluminescent light emitting diode, as it is taught by Huggins, as the light source in the modified system of Doucet, Liou, and Buser in order to generate wavelength stable light beam for the communication system.

Regarding claim 45, Doucet further teaches that the system comprising a propagating optics to propagate the phase incoherent collimated beam of light across the free space (fig. 8, optical antenna 710).

Regarding claim 46, Doucet further teaches that the propagating optics further includes an active pointing and tracking module to control the direction in which the incoherent beam is propagated (fig. 8, beam alignment detector 762 and active optics control system 760).

Response to Arguments

6. Applicant's arguments filed on December 19, 2005 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Swanson et al. (U.S. Patent US 5.062.150) teach a fiber-based free-space optical system using both coherent and incoherent optical system. Milano et

al. (U.S. Patent US 5,870,215) disclose a compact infrared identification and communication assembly using incoherent infrared light.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qzw
3/7/2006

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